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ABSTRACT

This study compares the results of three psychometric tests which were administered to middle class children in first, third and fifth grades in Puerto Rico and to a similar sample in New York State. The tests used were: (1) the Matching Familiar Figures (MFF) Test, (2) the Intellectual Achievement Responsibility (IAR) Scale, and (3) a paired associate learning task. For each test, a comparative analysis was made of results from each sample population. Findings indicate substantially similar patterns of response to test items at each age level across cultures. This commonality is attributed to the fact that middle class Puerto Rican and New York children share many cultural elements. In each culture, school practices, television programs, stores and job roles are closely comparable. The paired associate task did results in discrepant results across the two cultures; however, reasons for this are not understood and it is noted that the processes of memory do follow similar developmental trends in each population. Comparative psychometrics across cultures is discussed and the view is expressed that the underlying constructs that these three tests are designed to measure are meaningful in all cultures. (GO)

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Symposium on Culturally Meaningful Variables: Alternate Research Strategy for Research with Puerto Ricans, APA Convention, August 30, 1975

Cognitive Styles of Puerto Rican Children

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Basic psychological processes are universal. In all societies in all parts of the world humans come to know about their environment, to develop motives for their behavior, to develop processes of memory, to speak, and to develop motor skills. In different societies the ways in which basic processes are manifest may differ from one society to another. The content of what is remembered, the specific motives learned, and the precise motor skills mastered will vary between cultures as well as between individuals in the culture.

One way to attempt to understand cognition within a culture is to compare cognitive behaviors across cultures. An excellent discussion of the problems and the advantages of a cross-cultural approach to the study of cognition is included in the book The Cultural Context of Learning and Thinking by Cole, Gray, Glick, and Sharp (1971). A problem of cross-cultural research is the degree to which psychometrics developed and validated in one society are valid for use in another society. In the data reported today three different psychometric devices were employed with Puerto Rican middle class children in first, third, and fifth grade and with similar samples of New York State children. Each of the psychometrics employed was developed in the United States. To judge how appropriately these data describe middle class Puerto Rican children one must judge how appropriate each of the tests really is to the Puerto Rican middle class culture. This question will be considered for each of the psychometrics employed in this study.

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Data were collected through the help of Dr. Eduardo Rivera, Department of Psychology of the University of Puerto Rico and a group of graduate students

from the University who actually administered the tests. These students translated all test directions and materials into Spanish. All tests were individually administered.

The first psychometric to be considered was developed by Jerome Kagan (1965) and is called the Matching Familiar Figures (MFF). In the MFF the child is presented with a page which shows six pictures of a common object such as a house, a boat, or a pair of scissors. Each of these pictures is slightly different. For example, one house might have extra bricks in the chimney, one might lack a window sill and one might have an extra doorknob. At the same time the child sees the set of six pictures, he is presented a single picture which matches one of the six. The child is asked to find the one that matches exactly.

A stopwatch is used to measure the time which the child takes to make his first response (called latency score). Also, a record is made of the number of errors he makes before he chooses the correct match (error score). In general, children who respond very quickly tend to make more errors (impulsive), while children who take longer are likely to be more accurate (reflective).

School practices or cultural practices which stress the speed of response might be expected to encourage impulsiveness. The teacher who rewards the first person to raise his hand or the child who finishes his math problem quickly might be expected to increase children's tendencies toward impulsiveness. Encouraging a child to take his time, to think before he answers, should increase tendencies toward reflectivity. A culture that encourages fast responses in ambiguous situations should also lead to impulsivity, and one that stresses careful, accurate responses should lead to reflectivity.

Kagan and Kogan (1971) in summarizing research on the dynamics of reflection-impulsivity, report that children become more reflective at least over the age range 5 to 11 years, that the tendency to be reflective or impulsive is stable over both time and tasks, but also the tendency is somewhat modifiable. Thus, environmental

factors, including classroom dynamics, and certainly cultural differences might affect the degree of reflection-impulsivity which a child displays. Kagan (1965) found that reflective children made fewer errors in reading prose than did impulsive children, and Yando and Kagan (1968) found that reflective teachers influenced the responses of impulsive boys during the course of a school year.

Data comparing Puerto Rican and New York State children are presented in Figure 1. Both groups of children make significantly fewer errors with increased age

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Figure 1 about here

($p > .01$). Eight and ten-year-old children take significantly longer to respond than do six-year-old children. At age ten, Puerto Rican children take significantly longer than New York State children. However, the drop in time taken to respond to the pictures between the ages of eight to ten by New York students was unexpected, and the Puerto Rican data are more in harmony with other findings on children in the United States. No other differences between New York State and Puerto Rican children were found. In general, both groups of children get more reflective with age, and the patterns of change appear very similar. The pictures used in the MFF represent objects present in both cultures and the task does not involve language.

The underlying construct which the MFF is designed to measure is defined by Kagan and Kogan (1970) as, " . . . the degree to which the subject reflects on the validity of his solution hypothesis in problems that contain response uncertainty."

While the MFF has been recently criticized (Block, Block, and Harrington, 1974) and defended (Kagan and Messer, 1975), the human behavior which it is designed to tap can be assumed to exist in all societies. Our data suggest that the measure does work in Puerto Rico and that middle class Puerto Rican children show a moderate developmental change between ages six to ten from relatively impulsive to relatively reflective. The specific pictures in the test appear equally familiar in New York State than in Puerto Rico. Trees, houses, and ships, for example, are familiar in both cultures.

The second cross-cultural comparison considered was derived from a psychometric called the Intellectual Achievement Responsibility (IAR) Scale. (Crandall, Katkovsky, and Crandall, 1965). The IAR Scale consists of 34 items representing common intellectual and academic achievement situations which children might regularly experience. Half of these items are negative experiences. For example, the child might be asked, "If you did badly on a test, would it probably be (a) because you didn't know the material very well; or (b) because the teacher didn't like you." In this example, the answer "a" is scored as "negative internal" with "b" as the external option. A parallel item later in the test might ask, "If you did very well on a test, would it probably be because (a) the teacher liked you very well; or (b) you knew the material." Answer "b" is scored as "positive internal." Scores are recorded in the internal direction so that three scores are obtained: first, the internal positive score - the degree to which the child believes his own behavior is responsible for positive outcomes; second, the internal negative score - the degree to which he assumes responsibility for negative outcomes; and third, a total score for internal control. In several studies little relationship has been found between the positive and negative scales (i.e., Crandall, et. al., 1965). While the IAR is often used as a group measure, all items in this study were individually read to the child and his response recorded. Since the IAR is generally not appropriate below the age of seven or eight, only the eight and ten-year-old children in this study were given the test.

In Figure 2 data are presented on the scores on the Intellectual Achievement Responsibility measure of locus of control for Puerto Rican and U.S. children ages

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Figure 2 about here

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eight and ten. As can be seen, scores of the two groups are virtually identical at age eight, and they are not significantly different at age ten.

The Puerto Rican graduate students were asked the degree to which the questions in the IAR represented situations familiar to Puerto Rican children. They felt that questions on the test generally were appropriate. If the test is indeed valid in both cultures then the quality of internal control is developed to much the same degree in Puerto Rican middle class children and United States children. Both groups scored higher in internal control than did British middle class children and Puerto Rican lower class children (Clark, 1974).

A third psychometric procedure employed was a paired associate learning task developed and used by Dilley and Paivio (1968). The test materials consist of sets of five pictures of concrete familiar objects and five familiar words. Children are asked to remember the pictures and words that go together. After the task is explained, a learning trial is given in which each picture and word is paired. Then the child is given each stimulus (picture or word) and asked to name its partner. If the child cannot remember he is given the correct answer. Trials continue until the child gets all five of the stimulus response pairs correct two times in a row. The score for the child is the number of trials to arrive at the criterion of two correct trials. Each child is tested twice, once with pictures in the stimulus position and once with words in the stimulus position. Order is counter-balanced.

Data for Puerto Rican and New York State children are summarized in Table 1. As expected, older children in both cultures perform better than younger children. On an overall basis, differences between Puerto Rican and New York State children are not significantly different. However, the interaction between the picture-word and word-picture condition, New York State children replicate the Dilley and Paivio (1968) finding of better performance in the picture-word condition, while Puerto Rican children overall are better in the word-picture condition. Paivio (1971) reasons that pictures are easier for children to encode as images than are words, and that the image formed in the mind of the learner then acts as a "conceptual peg" to relate the item in the response term. For adults the speed of processing concrete

words into images is so fast that differences in word-picture and picture-word are not expected.

It is not clear why these differences of Puerto Rican and New York State were found. Perhaps there are subtle cultural or language factors which affect the ability to remember the pairs of words used in this study. For those interested, the two sets of words are presented in English and Spanish in Table 2. Of significance in terms of the thesis of this paper, however, is the overall finding that processes of memory also seem to be following similar developmental trends in Puerto Rican and New York State elementary school children. Equal scores on psychometrics from one culture to another do not necessarily mean that the test is measuring the same thing or has equal validity in both cultures. We seem to have more reason to question, however, when psychometrics used across cultures show one cultural group to be scoring in a more favorable way than another cultural group. Then we certainly need to wonder whether the content is equally familiar, whether the directions of the test carry the same message, whether the response demands are really the same. In the data reported here, an effort has been made to select psychometrics and to translate directions so that tests developed in the United States would indeed be valid for Puerto Rican children. The underlying constructs that these tests are designed to measure are seen as meaningful in all cultures.

Other papers in this symposium will, I suspect, make clear some concepts and cognitions that may be held differently by Puerto Rican and mainland children. Certainly these differences are of importance. At the same time, we should recognize our commonality. At the middle class level of this study children in Puerto Rico and in New York share many cultural elements. School practices are in many ways similar, television programs come from the same network, stores stock many of the same brand names, and job roles are comparable. With these and other elements in common one might expect similar developmental patterns of conceptual tempo,

internal control, and short-term memory. The fact that such similarities were found helps to validate the specific psychometrics employed for use in the Puerto Rican culture.

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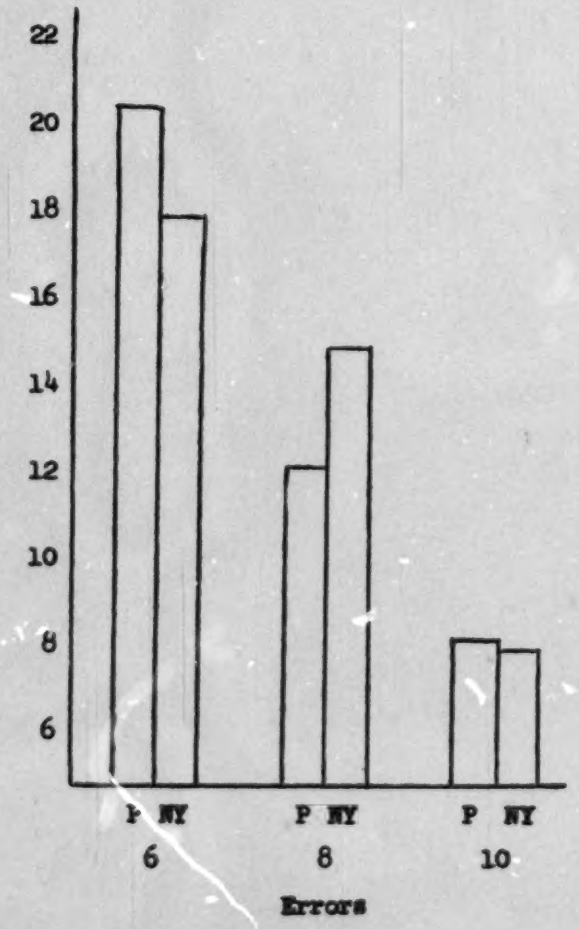
Figure 1

Group and Latency Scores on Matching Familiar Figures Test

P = Puerto Rican
NY = New York



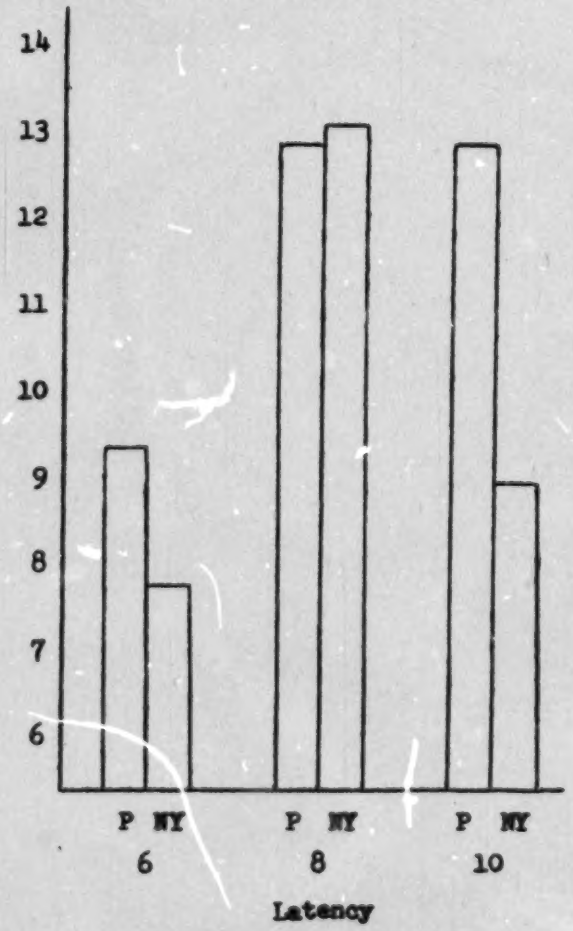


Figure 2

IAR Scores for Positive, Negative, and Total Internal Control

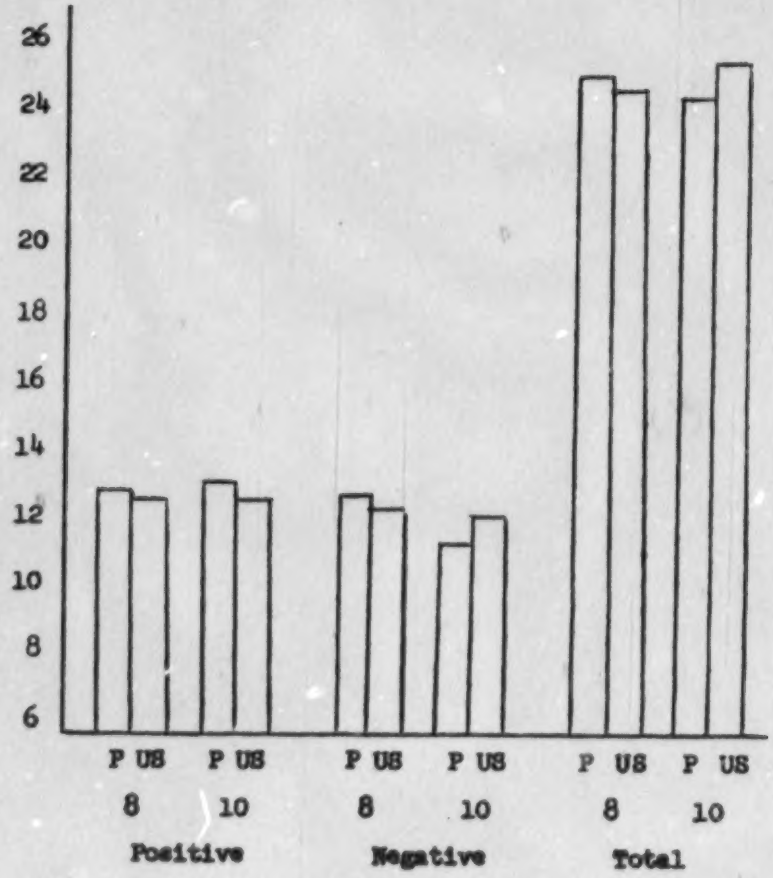


Table 1

Average Number of Trials to Criterion for
Picture-Word and Word-Picture Paired Associations

Grade		Picture-Word	Word-Picture	Average
1	PR	4.75	3.79	4.27
	NY	3.07	4.00	3.54
3	PR	2.04	1.71	1.88
	NY	1 62	3.15	2.39
5	PR	1.47	1.74	1.40
	NY	1.07	2.93	2.00

Table 2

Paired Associate Lists in English and Spanish

Set A

	Word-English	Picture	Word-Spanish	Picture
1.	ball	hat	bola	sombrero
2.	coat	bird	abrigo	pajaro
3.	grass	chair	yerba	sillo
4.	wood	plane	madera	avion
5.	ocean	tree	mar	arbol

Set B

1.	dog	star	perro	estrella
2.	farm	flower	finca	flor
3.	river	shoe	rio	zapato
4.	hair	man	pelo	hombre
5.	dress	hand	traje	mano